0005

#3136

WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

March 24, 2010

TO: Internal File

THRU: James D. Smith, Permit Supervisor 29 Mar 10

FROM: Steve Christensen, Environmental Scientist

RE: 2008 Third Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, Task ID #3136

The West Ridge Mine is currently operational in the Book Cliff Mountain range of Carbon County, UT. Water monitoring data is submitted quarterly to the Division EDI database. Beginning on page 7-34 of the approved Mining and Reclamation Plan (MRP), water monitoring protocols and sampling requirements are provided for surface water, ground water, monitoring wells and UPDES outfalls in Tables 7-1, 7-2, 7-3 and 7-4 respectively.

1. Was data submitted for all of the MRP required sites? YES ☒ NO ☐

Springs

The approved MRP outlines the monitoring of 10 springs. Four of the springs (SP-12, SP-13, SP-15 and SP-16) discharge from the lower slopes of West Ridge in Whitmore Canyon. Two springs (WR-1 and WR-2) discharge from the upper slope of West Ridge in Whitmore Canyon. One spring (SP-8) discharges in the upper drainage of C Canyon. Hanging Rock Spring (S-80) is located near the northwest corner of the permit area and discharges from the east slopes of Whitmore Canyon. Spring 101 monitors Little Spring at the bottom of West Ridge. Spring 102 is located within Spring Canyon.

Data was submitted for all 10 spring monitoring sites.

Streams

The approved MRP outlines the monitoring of 12 stream sites. Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. Operational sampling is required quarterly for six stream sites (ST-3, ST-8, ST-9, ST-10, ST-13 and ST-15). Four sites (ST-5, ST-6, ST-6A and ST-7) are equipped with automatic samplers that are required to be checked following precipitations events. Sites ST-11 and ST-12 were added to the water-monitoring

program based upon field inspections conducted in 2005. The field inspections were conducted as part of a proposed lease expansion by the Permittee. At the time of the inspections, the Bear Canyon drainage had exhibited measurable flow. As a precaution, sites ST-11 and ST-12 were established within that drainage. Since that time (summer of 2005) neither site has produced appreciable/measurable flow. However, the sites remain as part of the surface water monitoring program and are inspected quarterly.

Data was submitted for all 12 stream monitoring sites.

Wells

Operational sampling is required quarterly for one groundwater monitoring well (Site DH 86-2).

Monitoring well DH 86-2 was sampled during this quarter and all required data submitted.

UPDES

Operational sampling is required monthly for two active UPDES sites (Permit # UT0025640). Site D001 is the mine sites primary sediment pond discharge to the ephemeral 'C' Canyon drainage. Site D002 is the mine-water discharge to the ephemeral 'C' Canyon drainage. Specific limitations and self-monitoring requirements as outlined in the UPDES permit are presented in the table below:

Effluent Characteristics	Effluent Limitations
Flow, MGD (million gallons per day)	1.0
Total Suspended Solids (TSS), ppm	70
Total Iron, ppm	1.3
Oil & Grease, ppm	10
Total Dissolved Solids (TDS), ppm	2,000
pH	9

The Permittee submitted all required samples per the terms of the UPDES discharge permit.

2. Were all required parameters reported for each site? YES ☒ NO ☐

Surface Water Monitoring Sites: All required parameters were reported for sites with measurable flow.

Groundwater and Well Monitoring Sites: All required parameters were reported for sites that measurable flow.

UPDES: Site D001 did not produce any discharge during this quarter. All required parameters were reported for Site D002.

3. Were any irregularities found in the data? YES ☒ NO ☐

Surface Water Monitoring Sites- The following irregularities were found in the reported surface water monitoring data:

ST-10- Based upon rainfall data and discussions with the Permittee, it appears likely that the following irregularities were produced by a large precipitation event that occurred just prior to sampling. The surge of stormwater and the resulting scouring of the channel could very well have produced the increased results. Continued monitoring will determine if that is the case.

- Total Suspended Solids (TSS) was reported above two standard deviations (STD). The mean value is 50.6 parts per million (ppm). A value of 196 ppm was reported.
- Total Dissolved Solids (TDS) was reported above two STD. The mean value for TDS is 315.13 ppm. The reported value was 383 ppm.
- The Cation-Anion PC Difference was reported above two STD. The mean value is 1.75. The reported value was 2.17.
- Total Iron (T-Fe) was reported above two STD. The mean value for T-Fe is 0.97 ppm. The value reported was 4.476.

ST-3- As with surface water monitoring site ST-10, several parameters values were reported above two standard deviations from the mean of the data set. It's likely that the same storm event produced the elevated concentrations of the following parameters. Continued monitoring will be conducted to determine if the rainfall event was the cause.

- Cation-Anion PC Difference was reported out by 3.67 STD with a mean value of 0.54 and a reported value of 9.16.
- TSS was out by 5.21 STD with a mean value of 71.27 ppm and a reported value of 972 ppm.

ST-6- The reported flow value was out by 3.47 STD with a mean value of 190.55 and a reported value of 1,436.16. The Permittee indicates that the increase in flow was due to larger volumes of mine-water encountered within the active workings underground. The increase in flow did not produce notable increases/decreases in any of the other required parameters.

ST-5- During the previous two quarters (WQ08-1 and WQ08-2), flow values were reported outside of two standard deviations (762.96 ppm and 897.6 gpm respectively). The reported flow value for this quarter is 3.5 gpm. Mine-water discharge is the primary source of water at this monitoring point. As a result of changing conditions underground in the mine works, the flow trends at this monitoring point have been erratic over time.

ST-9- Several parameters reported for this site appear to have been directly affected by a rainfall event prior to sampling (as with ST-3 and ST-10). Continued monitoring will be conducted to determine if the rainfall event caused the following elevated concentrations.

- TSS was out by 3.59 STD with a mean value of 61.27 ppm and a reported value of 404 ppm.
- Dissolved Calcium (D-Ca) was out by 2.16 STD with a mean value of 2.06 ppm and a reported value of 3.44 ppm.
- Dissolved Potassium (D-K) was out by 2.44 STD with a mean value of 2.06 ppm and a reported value of 3.44 ppm.
- TDS was out by 2.28 STD with a mean value of 432.91 ppm and a reported value of 534 ppm.
- T-Fe was out by 3.66 STD with a mean value of 1.79 and a reported value of 12.24 ppm.

The previous two quarters, elevated flow values had been reported for site ST-5: 763.96 gpm and 879.6 gpm for the 1st and 2nd quarters of 2008 respectively. A flow value of 3.5 gpm was recorded for this quarter. This dramatic drop in flow is most likely attributable to changes in how the encountered mine-water is being routed within the mine. Erratic flow values have been historically reported at this monitoring site due to changes in encountered flow conditions in the underground workings.

Groundwater Monitoring Sites- Several irregularities were found in the reported groundwater monitoring data:

SP-8- Field pH was out by 2.03 STD with a mean of 8.12 and a reported value of 8.86. T

WR-1- Cation-Anion PC Difference was out by 2.19 STD with a mean of 1.49 and a reported value of 4.63.

SP-102 had reported a D-Na value above two STD the previous quarter (WQ08-2 49.75 ppm reported). The D-Na value for this quarter dropped back to within two STD (41.29 ppm reported).

SP-15 had reported SO4 and TDS levels above two STD (146 ppm and 508 ppm respectively) the previous quarter (WQ08-2). The reported values for SO4 and TDS this quarter

were back to within two STD of the mean (118 ppm and 451 ppm respectively).

WR-2 had reported an elevated concentration of D-Na beyond two STD the previous quarter (33.77 ppm). The spring was not producing a measurable flow this quarter and could not be sampled.

UPDES Sites-

Site D001 (primary sediment pond at mine site) did not discharge this quarter.

During the 1st quarter of 2008, Site D002 (mine-water discharge) reported a total suspended solids (TSS) value of 103 ppm, which exceeded the 70 ppm standard established in the Permittee's UPDES Discharge Permit (# UT0025640). However, based upon 3 reported sampling events during the 2nd quarter of 2008, the TSS levels had returned to within compliant levels (7 ppm, 18 ppm and 14 ppm respectively). Based upon discussions with the Permittee, a sump pump in the underground workings was inadvertently allowed to pump untreated water to the surface.

During this quarter, all required parameters were reported and were within two standard deviations of the data set mean (including TSS).

4. On what date does the MRP require a five-year re-sampling of baseline water data.

On page 7-35 of the approved MRP, the Permittee commits to collecting baseline samples "*from each spring in the monitoring program during the low flow (fall) sampling and from each stream monitoring sites during low flow every five years beginning with the first mid-term review.*"

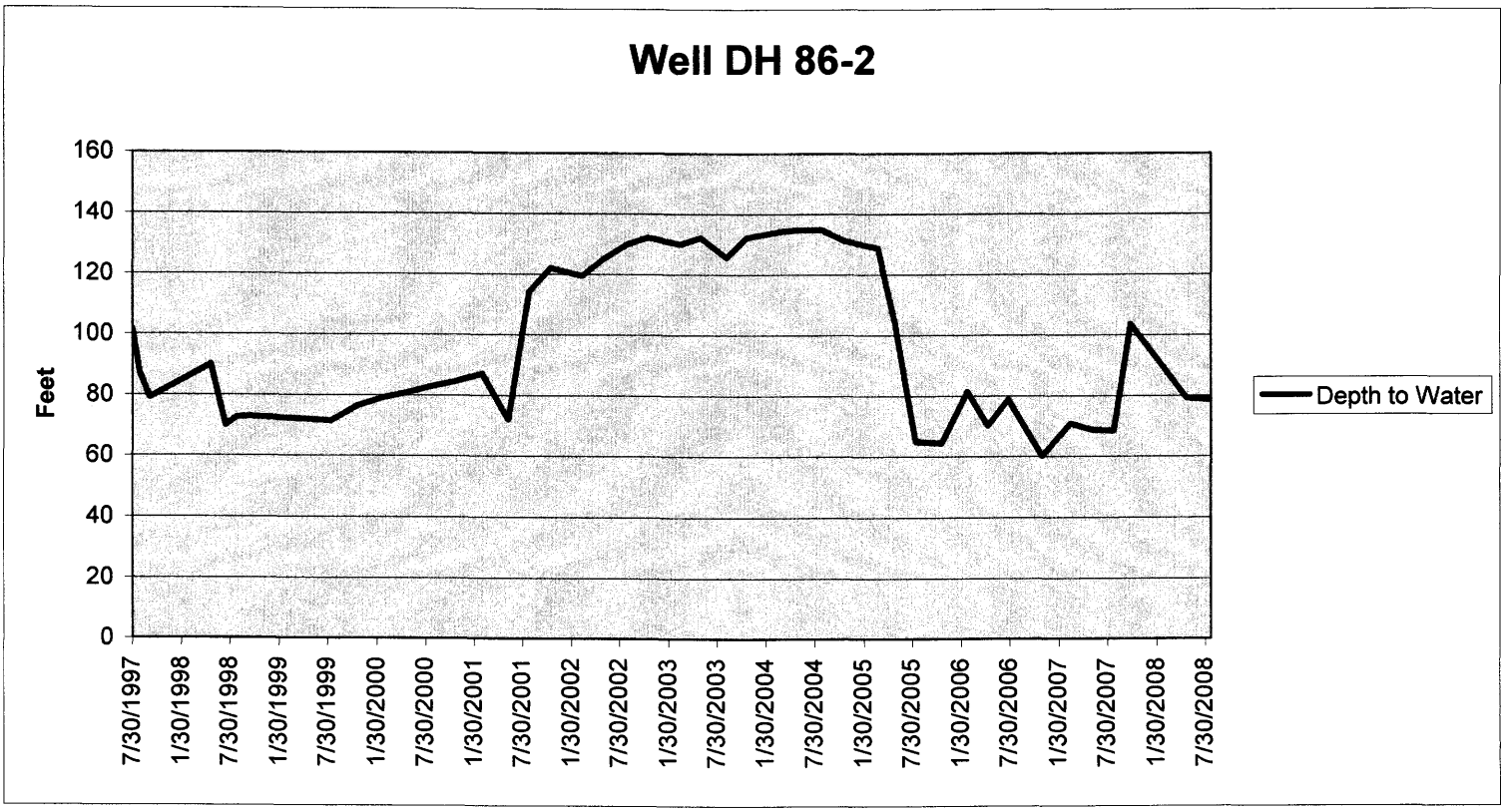
The Division initiated the last mid-term review on November 9th, 2006. As such, baseline sampling of ground and surface water sites will be required during the 3rd quarter of 2011.

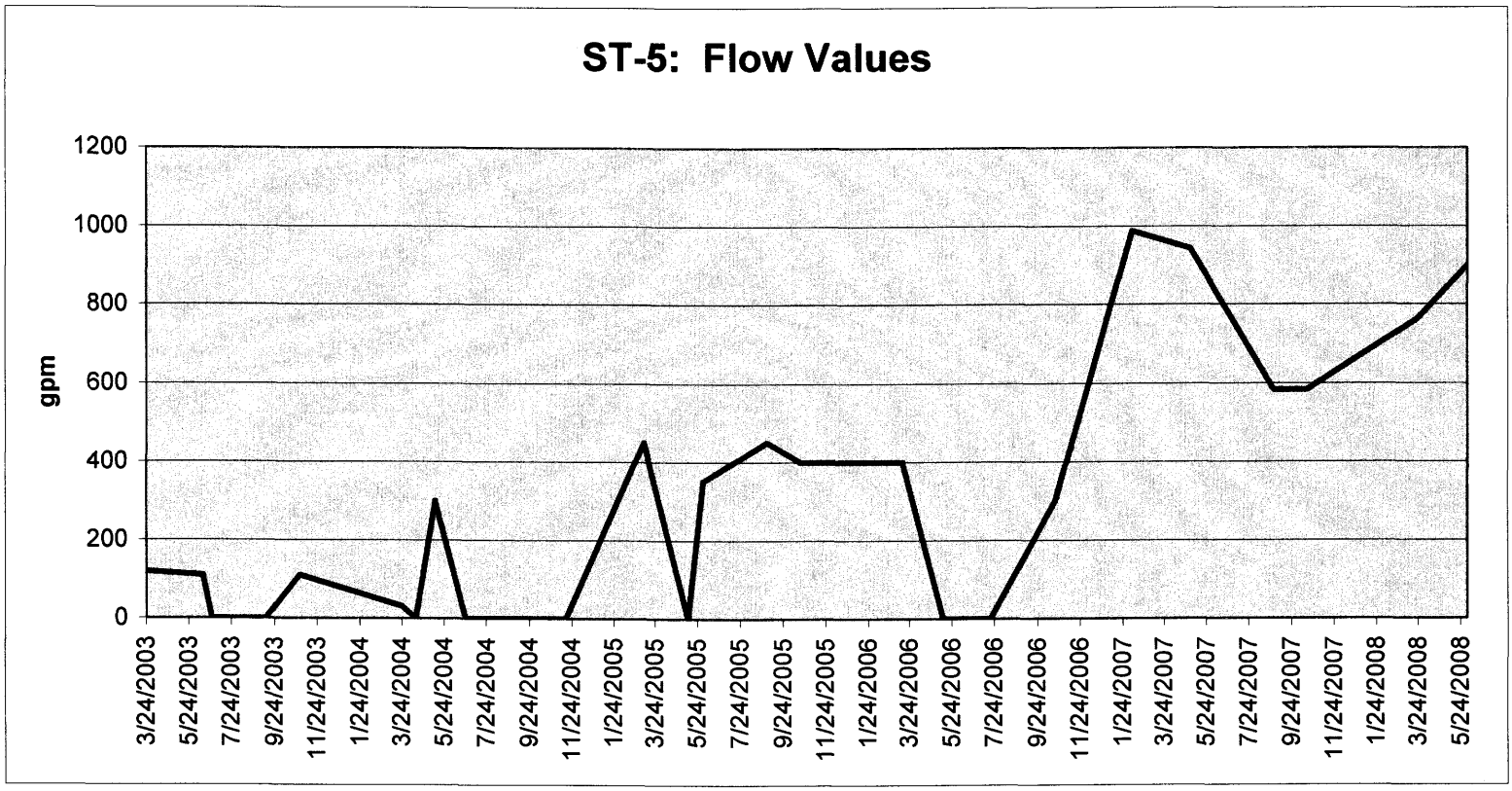
5. Based on your review, what further actions, if any, do you recommend?

Continue to monitor the data irregularities cited above for any trends.

6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements? YES ☐ NO ☒

7. Follow-up from last quarter, if necessary. Did the Mine operator submit or provide an explanation for missing and/or irregular data? YES ☐ NO ☒


Well DH 86-2
Feet
160
140
120
100
80
60
40
20
0
7/30/1997
1/30/1998
7/30/1998
1/30/1999
7/30/1999
1/30/2000
7/30/2000
1/30/2001
7/30/2001
1/30/2002
7/30/2002
1/30/2003
7/30/2003
1/30/2004
7/30/2004
1/30/2005
7/30/2005
1/30/2006
7/30/2006
1/30/2007
7/30/2007
1/30/2008
7/30/2008
Depth to Water


ST-5: Flow Values
gpm
1200
1000
800
600
400
200
0
3/24/2003
5/24/2003
7/24/2003
9/24/2003
11/24/2003
1/24/2004
3/24/2004
5/24/2004
7/24/2004
9/24/2004
11/24/2004
1/24/2005
3/24/2005
5/24/2005
7/24/2005
9/24/2005
11/24/2005
1/24/2006
3/24/2006
5/24/2006
7/24/2006
9/24/2006
11/24/2006
1/24/2007
3/24/2007
5/24/2007
7/24/2007
9/24/2007
11/24/2007
1/24/2008
3/24/2008
5/24/2008